

Background

In Fiscal Year 2014, the Legislature appropriated \$5M to Kansas State University to strengthen KSU's animal health research and related programs for the purpose of supporting economic growth and prosperity for Kansans. Animal health is defined at KSU to include the entire life cycle of animals plus the natural resource base that supports them. This view of animal health encompasses most of the Kansas State University colleges and many industry sectors of strategic importance to Kansas including agriculture (crops, livestock and all related products and services), pharmaceuticals, equipment manufacturing, transportation, human and pet food and nutrition, and aviation (through unmanned aerial systems).

In order to more accurately portray this breadth, Kansas State University, with approval from the Department of Commerce and the Board of Regents, changed the name of the program supported by this funding from "Animal Health" to "Global Food Systems". At the same time, KSU President Kirk Schulz launched an institution-wide initiative designed to enhance the University's reputation and attract more resources to the state for multidisciplinary research and academic programs in this umbrella category.

Use of Funds: Guiding Principles

KSU has been deploying the State's Animal Health/Global Food Systems Grant in accordance with the following principles.

- **Private Sector Wealth:** The majority of the program funding will support activities that attract or generate private sector wealth in industries related to animal health and global food systems.
- **GFS Research Funding:** Funding will also target the attainment of research grants in pursuit of foundational discoveries that will benefit global food systems industries and Kansas communities.
- **GFS Capacity:** Targeted investments may also be made in project areas that build institutional capacity in global food systems such as human capital and stakeholder engagement.

Use of Funds: Summary

| | Investment | % of Total |
|---|-------------------|-------------------|
| Attract/create private sector investment | | |
| Strategic Private Sector Partnerships | 2,465 | |
| Commercialization Proof of Concept Projects | 390 | |
| Corporate Partnership Facilities | 55 | |
| Entrepreneurship/Education | 25 | |
| Sub-Total | 2,935 | 59% |
| Attract sponsored funding in support of industry needs | | |
| Biosecurity Research Institute | 1,769 | |
| DHS Bio/Agrodefense Partnership | 80 | |
| Sub-Total | 1,849 | 37% |
| Build capacity and reputational wealth | | |
| GFS Program Development/Stakeholder Engagement | 150 | |
| Research Support Process Improvement | 65 | |
| Sub-Total | 215 | 4% |
| TOTAL STATE INVESTMENT | 5,000 | |

Use of Funds: Investment Highlights

Strategic Private Sector Partnerships, \$2.9M

Technology Acceleration Partners, LLC

Technology Acceleration Partners (Tech Accel) is a new Kansas company co-founded by Kansas State University, the Bicknell Family Holding Company, and Michael Helmstetter, former CEO of MRI Global. Based in Leawood, the animal health and agriculture research development company is introducing a novel approach to advancing new discoveries into the marketplace. Tech Accel identifies promising early stage technologies, finds corporate partners who co-invest in the final product development efforts, hires scientists to perform additional research, then shares the profits from each end product with the project partners.

Tech Accel's founding investors include Terry Dunn, President and CEO of JE Dunn Construction Group; Marty Bicknell, CEO of Mariner Holdings; Paul DeBruce, CEO of grain specialist DeBruce Companies; Gary Forsee, former Chairman and CEO of Sprint and former President of the University of Missouri System; and Kansas State University. Other founding investors are: Greg Graves, President and CEO of Burns & McDonnell; Cliff Illig, Vice Chairman of Cerner; Roshann Parris, President and CEO of Parris Communications; and John Sherman, Founder and former CEO of Inergy.

Kansas State University's Institute for Commercialization (KSU-IC) created the concept behind Tech Accel as a new way to raise capital that could be used to advance technologies to the point of commercial readiness. The idea of identifying a corporate partner who would co-fund the research and development then market and distribute the resulting product in order to reduce investment risk for all parties appears to be without precedent in the United States academic community.

KSU-IC continues to provide services to Tech Accel on a contract basis. Kansas State University President, Kirk Schulz, serves on the company's board of directors with the other founding investors.

KSU has been evaluating a follow-on investment in FY15.

Private Sector Challenge Grant Program

Kansas State University has committed a minimum of \$1.7M plus funding for sales, program development, and marketing costs from this grant to develop and implement partnerships with companies in agriculture and animal health. Partnerships funded through this program involve joint and/or corporate-sponsored research and new jobs and/or investments in Kansas.

• **Unmanned Aerial Systems Partnership**

A well-established, autonomous UAS and remote sensing company is partnering with Kansas State to solve large, complex challenges in agricultural applications of unmanned aerial systems. In exchange for access to experts in multiple KSU colleges and the controlled use of the Kansas State University brand, this company has agreed to establish an office in Salina or Manhattan, purchase training courses, share profits from jointly-developed products, and fund research efforts at KSU. Negotiations for new projects and investments are taking place in FY15.

• **Leading Food Company Partnership**

A top global food company has signed an agreement with KSU to develop and produce improved wheat varieties with targeted functional and processing qualities, improved nutrition, and reduced reactivity to inflammatory proteins. This project supports new PhD level scientists and a new staff scientist in Manhattan to conduct the joint research and manage the partnership. Expansion of internship programs, relocation of additional company personnel, and new research projects are being explored in FY15.

• **Pet Food Supply Chain Company Partnership**

KBED, an economic development partnership among the City of Manhattan, the Manhattan Area Chamber of Commerce, and several Kansas State University entities, created a strategic

initiative designed to attract investments from pet food companies to Manhattan and the University by featuring research, talent development, and executive training capabilities resident at KSU. The initiative is led by a KSU resource in the College of Agriculture with extensive industry experience and connections. KSU, through this grant, committed a minimum of \$250,000 for program development and incentives to private sector partners willing to invest in research and/or increase employment in Kansas. The initial private sector partner is a Kansas-based global manufacturing company.

- **Four additional significant projects are in negotiations and will be supported by a combination of FY14/FY15 funding along with matching contributions from each company.**

Commercialization Proof of Concept Projects

Investments in this category are made to conduct technical feasibility studies for research with potential appeal to companies in animal health and global food systems-related industries. Initial market feasibility studies have been conducted by KSU's Institute for Commercialization (KSU-IC) and all funded projects have received letters of interest from companies who are monitoring research results. This funding helps selected projects cross the "valley of death", or the gap in funding that occurs between early stage research primarily funded by the federal government and private sector investment.

• **Detection of Early Mastitis in Dairy Cows**

For the past few years, a multi-disciplinary research team at Kansas State University has been developing a nanoplatform technology for the early detection of human cancer. Last year, a large global company approached KSU-IC seeking new technology that could potentially detect mastitis in dairy cows earlier than current technologies on the market. Preliminary experiments have demonstrated that the nanoplatform designed to detect human cancer could also discover inflammation in milk samples from cattle with subclinical mastitis in fewer than five minutes. The State of Kansas/Commerce grant together with Kansas Board of Regents EPSCOR funding is being used to design and validate test strips that will detect mastitis earlier and with less cost than current alternatives. The research team will also use this investment to determine the presence of bacterial enzymes that increase the shelf-life of milk and milk-based products. These technologies, if proven out, will be licensed to corporate partners who have been identified by KSU-IC.

Additional projects have been vetted and funded during FY15 with a \$270,000 program announced by KSU-IC and KSURF, Kansas State's research foundation.

- **In Vivo Efficacy Study of a Novel Protease Inhibitor for Feline Infectious Peritonitis**

Feline infectious peritonitis is the leading cause of death among cats under five years of age. KSU scientists have identified and synthesized patent pending compounds that inhibit the spread of FIP and related viruses such as foot and mouth disease. A Kansas-based animal health company is interested in licensing the drug pending results of a proof-of-concept study in cats that have been experimentally infected with the FIP virus. This grant is funding the in vivo efficacy study.

- **Coatings for Animals to Manage Solar Radiation: Mitigation of Heat Stress**

Heat stress in feedlot cattle is a serious animal welfare and economic problem, and because cattle represent over 48% of Kansas agricultural cash receipts (USDA - Kansas Ag Statistics), prevention of this stress is a significant unmet need for the Kansas economy. Researchers at K-State connected the dots between heat stress in cattle, the reflectance properties of titanium dioxide, and feedlot management needs to design a means to mitigate heat stress in feedlot cattle.

The solution is to coat cattle with a material that reflects solar (thermal) radiation.

Proof-of-concept research, funded by this grant, is needed to optimize the coating properties and to confirm efficacy. One of the world's largest animal health companies has expressed interest in a distribution partnership pending results of this research.

Corporate Partnership Facilities

Kansas State has initiated a master planning project to integrate adjacent land into its main campus to improve and expand service to students, faculty scientists, and corporate partners, primarily operating in agricultural and veterinary disciplines. The areas are near the National Bio and Agro-defense Facility site, which serves as a magnet for private sector companies. This plan supports growth in research programs, private sector partnerships, and academic programs as envisioned by KSU's strategic plan, K-State 2025. The planning consultant, funded by the City of Manhattan, the KSU Foundation, KSU Athletics, and the State through this grant, is expected to submit a final draft of the plan in May 2015.

Included in this grant investment summary is a brochure highlighting the first building in the new KSU Corporate Partners Campus. This office building is fully pre-leased and will house company-sponsored interns and employees who are collaborating with faculty.



Entrepreneurship

- **Global Food Systems Launch-a-Business**

Kansas State University Launch-a-Business is an outreach program to help entrepreneurs launch and grow new ventures by leveraging K-State's unique resources. The College of Business has developed a launch-a-business program specifically for entrepreneurs in global food systems/animal health-related industries with assistance from the State's AH/GFS grant. The five-week program includes the following features:

- Custom start-up curriculum for turning concepts into ventures, designed and delivered by top KSU faculty
- One-on-one mentoring by KSU alumni and other industry and entrepreneurial experts in the KSU network
- Market and competitor research conducted by KSU students
- A contest that results in cash and in-kind prizes for the start-up that demonstrates the most potential through the course of the program

Entrepreneurs who are accepted into the GFS Launch-a-Business program must demonstrate the potential to create new jobs in Kansas.

The GFS Launch-a-Business program is expected to be sustained via corporate partnerships after three years.

DHS Bio/Agrodefense Strategic Alliances and the Biosecurity Research Institute, \$1.9M

Efforts to create an “ecosystem” of producers, animal health companies, scientists, workforce professionals, and policy makers/advisors surrounding NBAF accelerated in FY14 with the formation of a DHS-KSU program office supported by rules of engagement and an agreed upon framework to produce desired outcomes related to protecting the nation, the food supply, and related industries from biological threats. While NBAF is the catalyst for these coordinated planning and program implementation activities, KSU has been and will continue to conduct research, create technologies, and provide specialized training and education outside of the federal laboratory in service to the bio/agrodefense mission.

In FY14, the State of Kansas/Commerce grant provided funding for the Biosafety Research Institute (BRI), KSU’s one-of-a-kind biosafety level-3 facility that supports multidisciplinary research and training to study and combat pathogens that threaten our food supply, our economy, and our communities. Opened in 2008, the BRI attracts scientists and grants from around the world. It is also the center of KSU’s bio/agrodefense programs and is the research and training bridge to NBAF.

The grant allowed the BRI to train more than 100 scientists on procedures for handling select agents, prepared the facility and its employees to attain additional approvals to conduct research using highly pathogenic agents, and build an insectory to enable research on diseases that are transmitted by arthropods such as mosquitoes and ticks.

The grant also funded a portion of the costs related to planning a global bio/agrodefense symposium that will be held in Manhattan in June of this year.

Research Support Process Improvement, \$65K

The KSU research faculty, related administrators, and KSU-IC have been placing an emphasis on increasing the amount of research that is informed and sponsored by companies related to animal health and global food systems. Infrastructure to support this new demand—including processes, staff, systems, and facilities—has not kept pace. More than 100 faculty and staff members participated in focus groups in FY14 to identify specific infrastructure-related issues. Working group leadership was appointed to develop a plan addressing priority items. The initial project resulting from the plan—GFS strengths validation—is underway. Funding from FY15 is being used to address additional priority requirements (e.g. commercialization web portal, program development for multi-disciplinary GFS building).

Matching Funds

KSU attracts funding and creates jobs from grants provided by non-state sources for animal health/global food systems research. The table below summarizes awards, expenditures, and jobs created/supported by this funding.

| FY14 Summary | Awards | Expenditures | FTE | Positions |
|---------------------|-------------------|---------------------|------------|------------------|
| Federal | 81,395,198 | 2,925,081 | 101 | 225 |
| Corporate | 10,914,913 | 2,355,693 | 93 | 236 |
| Other Non-Profit | 5,201,013 | 615,707 | 25 | 64 |
| Total | 97,511,124 | 5,896,482 | 219 | 525 |

